

REMARKS

In the Office Action, claims 1-12 and 35-39 were rejected. By the present response claims 1, 5 and 35 have been amended, claims 13-17 and 40-44 have been withdrawn, and claims 11 and 38 have been canceled. Upon entry of the amendments, claims 1-10, 12-17, 35-37, and 39-44 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested in light of the above amendments and in view of the arguments summarized below.

Restriction Affirmation

Applicants hereby affirm the election of claims drawn to Group I (claims 1-12 and 35-39) made during a telephone conversation on April 3, 2006. Claims 13-17 and 40-44 are hereby withdrawn from consideration.

Rejections Under 35 U.S.C. §102

Claims 1-12 and 35-39 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. patent no. 6,669,644, (hereinafter “Miller”). Claims 1 and 35 are independent. All of the recited claims are believed to be patentable as cited below.

Claims 1 and 35 and the Claims Depending Therefrom.

Amended claim 1 recites, *inter alia*, a sensor device that includes a multiplicity of sensor elements arranged at a front surface of a substrate. Each sensor elements is in contact with material of the substrate. The barriers reduce the coupling of a form of energy between the sensor elements, each barrier posing an obstacle to the propagation. As amended, claim 1 recites that the barriers extend into the material of the substrate but not completely through the substrate material, and that the barriers and adjoining portions of the substrate are coated with a thin layer of insulating material.

Amended claim 35 similarly recites, *inter alia*, an ultrasonic transducer device including a multiplicity of ultrasonic transducer elements arranged at a front surface of a substrate. Each transducer element includes a respective group of ultrasonic transducer cells electrically connected together and acoustically coupled to the substrate. A multiplicity of trenches in the substrate material are disposed in areas between the transducer elements, the trenches obstructing the propagation of acoustic wave energy therethrough. As amended, claim 35 also recites that the trenches extend into the substrate material but not completely through the material, and that the trenches and adjoining portions of the substrate are coated with a thin layer of insulating material.

The Examiner argued the Miller is believed to teach a sensor device where a plurality of sensor elements (210) are arranged on a substrate (220). The substrate has a plurality of barriers or trenches (215) for reducing coupling energy between sensor elements. Further, the Examiner cited FIGS. 2-5 of the reference and the accompanying discussion in Miller in support of the rejection.

Applicants have closely considered these passages and, indeed, the Miller patent as a whole. The cited passages from Miller, and the entire reference, do not support the Examiner's position, however. Applicants respectfully submit that the claims, as amended, require that barriers or trenches do not extend completely through the substrate material. As described in the present application, each of the barriers or trenches starts at the front surface of the substrate and has a depth less than a thickness of the substrate as depicted in the embodiment illustrated in FIG. 6. Support for Applicants' arguments may be found, *inter alia*, in the passage at lines 6-16 on page 11 of the application. In addition, in the embodiment illustrated in FIG. 8 of the application, each of the barriers and trenches starts at a rear surface of the substrate and has a depth less than a thickness of the substrate. Further support for this aspect of the claimed arrangement may be found, *inter alia*, in the passage at lines 5-11 on page 13 of the application. Furthermore, each of the barriers and trenches and adjoining portions of the substrate may be coated

with a thin layer of insulating material, as discussed, *inter alia*, in the passage at lines 1-7 on page 14 of the application.

On the contrary, as depicted in FIGS. 2-5 of Miller, a plurality of holes (215, 315, 415, 515) are etched through the MUT substrate 220 proximate to each MUT cell 216. More particularly, each via 215 is *etched completely through the MUT substrate 220*, thereby creating voids in the MUT substrate 220, as discussed, *inter alia*, in a passage at col. 3, lines 36-46 of Miller:

In accordance with an aspect of the invention, a plurality of holes, commonly referred to as vias, an exemplar one of which is illustrated using reference numeral 215. *Each via is etched completely through the MUT substrate 220*, thereby creating voids in the MUT substrate 220 that reduce or eliminate the propagation of acoustic energy waves traveling laterally through the MUT substrate 220. [Emphasis added].

Additionally, Applicants also wish to bring to the Examiner's attention that Miller teaches doping each of the vias 215 to be electrically conductive. Each of the electrically conductive vias 215 is then employed to electrically connect a MUT element 210 to associated circuitry, as discussed, *inter alia*, at col. 3, lines 49-58 of Miller:

In another aspect of the invention, each of the vias 215 can be doped to be electrically conductive. By making the vias electrically conductive, circuitry located on the surface of an integrated circuit (not shown in FIG. 2) that is applied to the back surface 222 of the MUT substrate 220 can be electrically connected through the conductive via 215 to each MUT element 210. Although omitted for clarity, each of the vias 215 can be connected to the MUT element 210 and the vias 215.

In summary, Miller teaches that the plurality of holes (vias 215) that are etched completely through the MUT substrate 220, while the present claims relate to structures in which barriers or trenches are formed such that each of the barriers or trenches starts at

the front surface or the back surface of the substrate and has a depth less than a thickness of the substrate. Additionally, each of the barriers of trenches is coated with an insulating material. Hence, Applicants respectfully submit that there is simply no similarity between the vias 215, 315, 415, 515 in Miller and the multiplicity of barriers in the claims. For the reasons summarized hereinabove, Applicants respectfully submit that Miller relied upon by the Examiner cannot support a *prima facie* case of anticipation of independent claims 1 and 35.

Further, the claims depending directly or indirectly from claims 1 and 35 are allowable by virtue of their dependency from allowable base claims, as well as for the subject matter they separately recite. Thus, it is respectfully requested that the rejections under 35 U.S.C 102 be withdrawn.

Rejections Under 35 U.S.C. §103

Claims 1-12 and 35-39 were also rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. patent no. 6,262,946 (hereinafter “Khuri-Yakub”) in view of Miller. All of the pending claims are believed to be patentable over the proposed combination.

Independent Claims 1 and 35 and Claims Depending Therefrom

The Examiner argued that Khuri-Yakub is believed to teach the claimed sensor device that includes a multiplicity of sensor elements arranged on the front surface of a substrate. Additionally, the Examiner also argued that Khuri-Yakub is believed to teach the sensor device that includes a barrier arranged in the substrate material to reduce the coupling of a form of energy between any of the sensor elements. Further, the Examiner acknowledged that Khuri-Yakub does not teach or suggest a multiplicity of barriers. The Examiner argued that Khuri-Yakub teaches a single barrier as illustrated in FIG. 10.

The Examiner relied upon Miller to teach a sensor device where a plurality of sensor elements are arranged on a substrate, where the substrate has a plurality of barriers or trenches for reducing coupling energy between sensor elements.

Here again, as previously noted, Applicants respectfully submit that Miller teaches a plurality of *holes or vias etched completely through the substrate*. Applicants reiterate that, on the contrary, amended claims 1 and 35 relate to a structures in which barriers or trenches are etched such that each of the barriers starts at the front surface or the back surface of the substrate and has a depth less than a thickness of the substrate.

Additionally, Applicants stress that both Miller and Khuri-Yakub fail to teach coating each of the barriers with an insulating material. Moreover, the references are not susceptible to combination to provide such insulation. In particular, Miller utilizes the vias taught in the reference for connections made with the transducer elements. As such, the vias could not be filled or coated as recited in the amended claims.

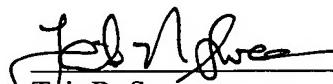
Hence, Applicants respectfully submit that the *combination* of the references cannot render obviousness of independent claims 1 and 35 as neither Khuri-Yakub nor Miller teaches the recitations of independent claims 1 and 35. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness can not be supported by the combination. Further, the claims depending directly or indirectly from independent claims 1 and 35 are allowable by virtue of their dependency from an allowable base claim, as well as for the subject matter they separately recite. Thus, it is respectfully requested that the rejection of the claims under 35 U.S.C 103(a) be withdrawn.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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